

(2) For metal intermediate bulk containers intended to contain liquids, when subjected to the 200 kPa (29 psig) and the 250 kPa (36 psig) test pressures specified in paragraphs (d)(2) and (d)(3) of this section, respectively, there may be no leakage.

(3) For rigid plastic intermediate bulk container types 2IH1, 2IH2, 3IH1, and 3IH2, and composite intermediate bulk container types 2IHZ1, 2IHZ2, 3IHZ1, and 3IHZ2, there may be no leakage and no permanent deformation which renders the intermediate bulk container unsafe for transportation.

§ 178.815 Stacking test.

(a) *General.* The stacking test must be conducted for the qualification of all intermediate bulk container design types intended to be stacked.

(b) *Special preparation for the stacking test.* (1) All intermediate bulk containers except flexible intermediate bulk container design types must be loaded to their maximum permissible gross mass.

(2) The flexible intermediate bulk container must be filled to not less than 95 percent of its capacity and to its maximum net mass, with the load being evenly distributed.

(c) *Test method.* (1) All intermediate bulk containers must be placed on their base on level, hard ground and subjected to a uniformly distributed superimposed test load for a period of at least five minutes (see paragraph (d) of this section).

(2) Fiberboard, wooden, and composite intermediate bulk containers with outer packagings constructed of other than plastic materials must be subjected to the test for 24 hours.

(3) Rigid plastic intermediate bulk container types and composite intermediate bulk container types with plastic outer packagings (1HH1, 1HH2, 2IHH1, 2IHH2, 3IHH1 and 3IHH2) which bear the stacking load must be subjected to the test for 28 days at 40 °C (104 °F).

(4) For all intermediate bulk containers, the load must be applied by one of the following methods:

(i) One or more intermediate bulk containers of the same type loaded to their maximum permissible gross mass

and stacked on the test intermediate bulk container; or

(ii) The calculated superimposed test load weight loaded on either a flat plate or a reproduction of the base of the intermediate bulk container, which is stacked on the test intermediate bulk container.

(d) *Calculation of superimposed test load.* For all intermediate bulk containers, the load to be placed on the intermediate bulk container must be 1.8 times the combined maximum permissible gross mass of the number of similar intermediate bulk containers that may be stacked on top of the intermediate bulk container during transportation.

(e) *Criteria for passing the test.* (1) For metal, rigid plastic, and composite intermediate bulk containers there may be no permanent deformation which renders the intermediate bulk container unsafe for transportation and no loss of contents.

(2) For fiberboard and wooden intermediate bulk containers there may be no loss of contents and no permanent deformation which renders the whole intermediate bulk container, including the base pallet, unsafe for transportation.

(3) For flexible intermediate bulk containers, there may be no deterioration which renders the intermediate bulk container unsafe for transportation and no loss of contents.

[Amdt. 178-103, 59 FR 38074, July 26, 1994, as amended by Amdt. 178-119, 62 FR 24743, May 6, 1997]

§ 178.816 Topple test.

(a) *General.* The topple test must be conducted for the qualification of all flexible intermediate bulk container design types.

(b) *Special preparation for the topple test.* The flexible intermediate bulk container must be filled to not less than 95 percent of its capacity and to its maximum net mass, with the load being evenly distributed.

(c) *Test method.* A flexible intermediate bulk container must be toppled onto any part of its top upon a rigid, non-resilient, smooth, flat, and horizontal surface.

(d) *Topple height.* For all flexible intermediate bulk containers, the topple height is specified as follows:

- (1) Packing Group I: 1.8 m (5.9 feet).
- (2) Packing Group II: 1.2 m (3.9 feet).
- (3) Packing Group III: 0.8 m (2.6 feet).

(e) *Criteria for passing the test.* For all flexible intermediate bulk containers, there may be no loss of contents. A slight discharge (e.g., from closures or stitch holes) upon impact is not considered to be a failure, provided no further leakage occurs.

§ 178.817 Righting test.

(a) *General.* The righting test must be conducted for the qualification of all flexible intermediate bulk containers designed to be lifted from the top or side.

(b) *Special preparation for the righting test.* The flexible intermediate bulk container must be filled to not less than 95 percent of its capacity and to its maximum net mass, with the load being evenly distributed.

(c) *Test method.* The flexible intermediate bulk container, lying on its side, must be lifted at a speed of at least 0.1 m/second (0.33 ft/s) to an upright position, clear of the floor, by one lifting device, or by two lifting devices when four are provided.

(d) *Criterion for passing the test.* For all flexible intermediate bulk containers, there may be no damage to the intermediate bulk container or its lifting devices which renders the intermediate bulk container unsafe for transportation or handling.

§ 178.818 Tear test.

(a) *General.* The tear test must be conducted for the qualification of all flexible intermediate bulk container design types.

(b) *Special preparation for the tear test.* The flexible intermediate bulk container must be filled to not less than 95 percent of its capacity and to its maximum net mass, the load being evenly distributed.

(c) *Test method.* Once the intermediate bulk container is placed on the ground, a 100-mm (4-inch) knife score, completely penetrating the wall of a wide face, is made at a 45° angle to the principal axis of the intermediate bulk container, halfway between the bottom

surface and the top level of the contents. The intermediate bulk container must then be subjected to a uniformly distributed superimposed load equivalent to twice the maximum net mass. The load must be applied for at least five minutes. An intermediate bulk container which is designed to be lifted from the top or the side must, after removal of the superimposed load, be lifted clear of the floor and maintained in that position for a period of five minutes.

(d) *Criterion for passing the test.* The intermediate bulk container passes the tear test if the cut does not propagate more than 25 percent of its original length.

§ 178.819 Vibration test.

(a) *General.* The vibration test must be conducted for the qualification of all rigid intermediate bulk container design types. Flexible intermediate bulk container design types must be capable of withstanding the vibration test.

(b) *Test method.* (1) A sample intermediate bulk container, selected at random, must be filled and closed as for shipment.

(2) The sample intermediate bulk container must be placed on a vibrating platform that has a vertical double-amplitude (peak-to-peak displacement) of one inch. The intermediate bulk container must be constrained horizontally to prevent it from falling off the platform, but must be left free to move vertically and bounce.

(3) The test must be performed for one hour at a frequency that causes the package to be raised from the vibrating platform to such a degree that a piece of material of approximately 1.6-mm (0.063-inch) thickness (such as steel strapping or paperboard) can be passed between the bottom of the intermediate bulk container and the platform. Other methods at least equally effective may be used (see § 178.801(i)).

(c) *Criteria for passing the test.* An intermediate bulk container passes the vibration test if there is no rupture or leakage.

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